REMARKS

This application has been reviewed in light of the Office Action dated March 13, 2007. Claims 12-20 are the only claims presented for examination. Claims 12, 16, 17 and 20 are in independent form. Claims 12 and 16-18 have been amended to define still more clearly what Applicant regards as his invention. Claim 20 has been added to assure Applicant of a full measure of protection of the scope to which he deems himself entitled. The original specification (including abstract) has been replaced with the substitute specification submitted herewith in both a marked and a clean version; no new matter has been added. Favorable reconsideration is requested.

In this connection, Applicant wishes to schedule an interview (personal, if possible) with the Examiner, prior to issuance of the Examiner's next Action.

Before addressing the outstanding rejections, Applicant wishes to note and briefly review the contents and results of the process S308 as described in pages 17-19 of the specification (although bearing in mind that the details of that embodiment are not to be read into the claims merely by virtue of this reference thereto).

The points in this process are as follows:

1) third sample points are obtained by mapping first sample points;

2) fourth sample points are obtained by mapping second sample points, into the second color gamut;

3) a relative position of an input color to surface gradation lines or internal gradation lines is calculated; and

4) an output color is calculated from the mapped surface gradation lines or the mapped internal gradation lines, based on the relative position.

The claim amendments shown above are intended to clarify still further the foregoing points (1) - (4).

In the outstanding Office Action, Claims 12 and 16-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,185,661 (Ng). In addition, Claim 13 was rejected under 35 U.S.C. § 103(a) as being obvious from *Ng* in view of U.S. Patent 6,058,207 (Tuijn et al.), and Claims 14 and 15, as being obvious from *Ng* in view of the cited Berns publication.

Independent Claim 20 is similar to Claim 12; although newly added, this claim will be discussed first.

Claim 20 is directed to a method that maps a first color gamut into a second color gamut. The first and the second color gamut each have a surface, and an interior "contained entirely within" that surface. The method of Claim 20 comprises, among other steps, "setting a set consisting of a first predetermined number of first sample points *on the surface* of the first color gamut, and a set consisting of a second predetermined number of second sample points *in the interior* of the first color gamut [emphases added]". (Compare Claim 12, which similarly recites "setting first sample points on a surface of the first color gamut, and second sample points in the first color gamut".) Applicant notes the assertions in the Office Action that *Ng* sets sample points on the surface of the source color gamut, and sample points in the interior thereof. Applicant has again studied that patent very carefully, and does not find any such disclosure in that document. In this connection, Applicant will discuss both the portions of that patent specifically cited by the Examiner in support of the mentioned assertion, and other portions as well.

For the setting of first sample points that lie on a surface of the first color gamut, the Office Action cites Figs. 6, 8 and 9A (element 18), and the description at col. 4, lines 37-42, and col. 8, lines 4-24, of *Ng*. In fact, none of these portions of *Ng* is even relevant to the quoted recitation of new Claim 20.

To begin with, *Ng*'s element 18, shown in Fig. 9A, is labeled a "3 x 3 transform matrix", which is described as receiving "modified separation signals R', G', B'" (col. 4, lines 19-22). That is, the input to matrix 18 is a set of signals produced by a correction circuit 16, operating on the raw signals R, G, B originally generated by the CCD sensors 14 scanning the document 12, the correction performed by circuit 16 being intended to compensate for "non-uniformity and shading variations" such as may be due to non-uniformity of the light source or the sensors (col. 4, lines 7-19). In addition, circuit 16 may apply different corrections depending on the medium on which document 12 is printed (col. 4, lines 22-26). The 3 x 3 transform matrix "converts the modified separation signals R', G', B', into a near-uniform color space (L*', a*', b*')in" (col. 4, lines 37-39). Additionally, *Ng* states that the transformation effected by matrix 18 may also be designed to preserve neutrality of the processed signals, transforming a signal where R = G = B to an output value in which a* and b* are close to zero (col. 4, lines 46-49). *Ng* also states that the signals produced by matrix 18, (L*' a*' b*") in, is the system's "best estimate of the color coordinates for the original input colors, i.e. those color on document 12 represented by the actual color space $L^*_a a^*_a b^*_a$" (col. 4, lines 50-56).

Applicant understands that matrix 18 operates on the corrected signals for each pixel by using the three components of that pixel (R', G' and B') as a vector that is

multiplied by the matrix. Applicant understands, also, that this operation is performed systematically for every pixel in the image.

Importantly, what element 18 is doing is processing the signal R', G', B' for circuit 16 for each and every pixel of the document 12. There is no suggestion in *Ng* that this element performs any step or function at all like the setting of the first and second sample points recited in Claim 20. For one thing, that "setting" in Claim 20 is defined as setting, as the first sample points, a limited set, of some specific number of points, each of which is on the surface of the first color gamut, and as the second sample points, a different set of some specific number of points each of which is in the interior of the first color gamut (and therefore not on the surface, as are the first sample points). In fact, while *Ng* refers both to points within the color gamut of the scanner, and to points outside that gamut (see col. 3, lines 60-66), there is no mention of any points that are exactly on the surface of that color gamut. Briefly, Applicant can find no suggestion in *Ng* that *any* point on the surface of the scanner's color gamut is singled out for use as a sample point, as is done with the "set consisting of a first predetermined number of first sample points on the surface of the first color gamut".[1]

[1/] It appears to Applicant that even this observation, by itself, leads to the conclusion that *Ng* does not disclose, or even hint at, the above-quoted setting step recited in Claim 20, and that by itself would be enough to compel the conclusion that Claim 20 is allowable over that patent. But since the *Ng* system does not perform the step of setting the sample points, it also certainly does not disclose or suggest any of the things that Claim 20 recites are done using that set of first sample points (obtaining third sample points in the second color gamut that correspond to respective ones of the first sample points, or setting first gradation lines based on the first sample points, or obtaining gradation lines in the second color gamut based on those first gradation lines, or performing color mapping based on the points and the gradation lines thus obtained in the second color gamut). For these reasons, also, Claim 20 is allowable over *Ng*.

Another portion of *Ng* specifically cited in the Office Action with regard to the setting of the sample points is in col. 6:

> "The requested input color datapoints L_i* a_i* b_i* may be the true color space values L_t *, a_t*, b_t* received from an input system as described above. With respect to FIGS. 5-9, the requested input color datapoint will be represented as P_i (L_i* a_i* b_i*) which will be mapped to an output color represented as P_o (L_o* a_o* b_o*) in the output color gamut printable by the particular printer." (col. 6, lines 9-16)

As far as Applicant can see, this merely states that the print engine output system 40 transforms datapoints from a "requested" color gamut, which Applicant understands to be the colors that it is desired to print, to an "output color gamut associated with a particular printer" (col. 6, lines 6-9). That is, each point of the body of image data to be printed (document 12) is transformed to a datapoint in the printer's color gamut. This reading is confirmed by the following text:

> "FIG. 6 illustrates the necessary mapping of the input color datapoint P_i, within the input color solid 15 to the printable output color datapoint P_o within the output color solid 17. The print engine system 40 is necessary because the output color gamut achievable by a particular printer does not often match the input color gamut of the input media. The system 40 is used, therefore, to handle the unprintable colors which lie outside of the output color gamut for the particular output device, e.g. the printer." (col. 6, lines 17-26)

Nothing in this portion of *Ng* teaches or suggests anything about a particular "set consisting of a first predetermined number of first sample points on the surface of the first color gamut", as recited in Claim 20.

In the print engine output system 40, according to *Ng*, the input signal is, for each pixel of the image to be printed, provided to a converter 32, which permits an operator to change or adjust the color, or which performs correction to take into account the type of

medium on which the output image is to be printed and the original image (col. 6, lines 42-53). The information output by converter 32 is provided to a LUT 34, which compresses the desired color if necessary to ensure that it is within the printer's output gamut (col. 61-68). Again, converter 32 operates on each pixel of the image that is being processed, and the resulting signal is input to LUT 34 for each pixel; no suggestion is made of specifying a "set consisting of a first predetermined number of first sample points on the surface of the first color gamut", as recited in Claim 20. The portion of *Ng* specifically cited reads:

> "Once the compressed L_o *" value is determined, the hue angle can be preserved. From the L_o*" output, the hue angle, H, is calculated according to the equation H=arctan (b_{op}*'/a_{op}*') since the *boundary values are stored in the lookup table 34* in terms of the hue angle, H and a_o*" pair. The *outer boundary of the printer's output color gamut is stored in the lookup table 34* in terms of four quadrants represented by a_o*" , b_o*" both positive; a_o*", b_o*" both negative; a_o*" positive, b_o*" negative; and a_o*" negative, b_o*" positive. By testing the signs of the a_{op}*' and b_{op}*' values, the appropriate quadrant can be determined before calculating the hue angle.
>
> "In order to preserve the hue H, but to reduce the saturation or chroma along the same hue angle, non-linear compression is also performed for the saturation, as was done for the L* space. By non-linearly compressing the saturation, all out of color gamut points a_{op}*', b_{op}*' as shown in FIG. 8, are compressed to a certain region 21 within the boundary surface 23 of the printable color solid or on the boundary surface 23 itself." (col. 8, lines 4-24; emphases added)

Applicant believes that this passage makes plain that the only "boundary" referred to is the boundary of the color gamut of the printer -- that is, the boundary of the *output* color gamut. (Also, note the description of Fig. 8 at col3, lines 35 and 36: "FIG. 8 is a diagram illustrating the boundary of an *output* color gamut [emphasis added]".) Moreover, even here, *Ng* is discussing processing that occurs for every pixel in the image, and is not suggesting setting a "set consisting of a first predetermined number of first sample points"

on the surface of any color gamut, much less suggesting setting a "set consisting of a first predetermined number of first sample points on the surface of the first color gamut", as recited in Claim 20.

Applicant submits that in fact, nothing in *Ng* discloses, or even suggests, setting a "set consisting of a first predetermined number of first sample points on the surface of the first color gamut", as recited in Claim 20. This would by itself compel the conclusion that Claim 20 is allowable over *Ng*. Applicant nonetheless wishes to point out briefly the following, as well.

Nothing in *Ng* discusses selecting "a set consisting of a second predetermined number of second sample points in the interior of the first color gamut", as is also recited in Claim 20. While *Ng* does mention the interior of the scanner's color gamut, nothing in that patent suggests that a set of a specified number of particular points in that gamut should be set as sample points, much less the other steps recited in Claim 20 that are based on that set of second sample points. For these reasons, also, Claim 20 is allowable over *Ng*.

The other independent claims are directed to an image processing method, apparatus and storage medium, respectively, similar to the method set out in Claim 20, but with different wording, and are believed to be allowable over *Ng* for substantially the reasons set out above, despite those differences in wording. For example, independent Claim 12 is directed to an image processing method which maps a first color gamut into a second color gamut, comprising setting first sample points on a surface of the first color gamut, and second sample points in the first color gamut, and obtaining third sample points by mapping the first sample points into the second color gamut, and obtaining fourth

sample points by mapping the second sample points into the second color gamut. Surface gradation lines are set, based on the first sample points, and internal gradation lines are set, based on the second sample points. The surface gradation lines are mapped based on the third sample points, and the internal gradation lines are mapped, based on the fourth sample points. A relative position of an input color to the surface gradation lines or the internal gradation lines is calculated, and an output color is calculated from the mapped surface gradation lines or the mapped internal gradation lines, based on the relative position. Also, according to Claim 12, the surface gradation lines and the internal gradation lines each indicate a locus of color change in the first color gamut, and the mapped surface gradation lines and the mapped internal gradation lines each indicate a locus of color change in the second color gamut.

Thus, while Claim 12 does not recite setting "set consisting of a first predetermined number of first sample points on the surface of the first color gamut", but only "first sample points on a surface of the first color gamut" (and thus does not explicitly recite that the number of first sample points is finite), Claim 12 does specify that certain points are selected on the surface of the first color gamut, and that certain subsequent processing is performed using those points. As discussed above, Applicant does not see anything in *Ng* that would teach or suggest selecting sample points on the surface of a first color gamut, much less the subsequent processing recited in Claim 12 utilizing such sample points. Accordingly, Applicant believes that method Claim 12, and apparatus Claim 16 and storage-medium Claim 17, as well, are allowable over *Ng*.

A review of the other art of record, including *Tuijn*, has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed

above, as a reference against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from Claim 12, and also are believed to be clearly patentable for the reasons discussed above. Nevertheless, because each dependent claims recites an additional aspect of the invention, the independent reconsideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and allowance of the present application.

Applicant's undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,

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